

**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF MASSACHUSETTS**

SINGULAR COMPUTING LLC,

Plaintiff,

v.

GOOGLE LLC,

Defendant.

C.A. No. 1:19-cv-12551-FDS

Hon. F. Dennis Saylor IV

**DEFENDANT GOOGLE LLC'S SUPPLEMENTAL BRIEF IN OPPOSITION TO  
SINGULAR'S MOTION *IN LIMINE* NO. 4**

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Google submits this supplemental brief on Singular’s motion *in limine* (“MIL”) No. 4 (Dkt. No. 619, “Mot.”), pursuant to the Court’s allowance at the December 21, 2023 pre-trial conference. 12/21/23 Tr. at 5-6. MIL No. 4 should be denied for at least the following reasons:

- *First*, Singular does not mask that MIL No. 4 seeks, in effect, summary judgment on Google’s invalidity defense, arguing that “VFLOAT is not prior art because it doesn’t meet the public use requirement.” 12/19/23 Tr. at 91. This is procedurally improper for reasons already explained. *See* Dkt. No. 644. But assuming the Court addresses the merits, a properly brought summary judgment motion requires that the Court “view the facts in the light most favorable to the nonmoving party and draw all reasonable inferences in that party’s favor,” requirements that Singular does not even acknowledge. *Penate v. Sullivan*, 73 F.4th 10, 17 (1st Cir. 2023).
- *Second*, applying that standard, genuine disputes of material fact require denying Singular’s *de facto* summary judgment motion. *See* Section II, *infra*. Not only does ample evidence establish that the VFLOAT system constitutes prior art that was “known or used by others in this country” under 35 U.S.C. § 102(a) and “in public use . . . in this country” under Section 102(b), Singular’s attorney argument to the contrary ignores swaths of evidence that will be presented at trial.
- *Third*, Singular’s motion fails to address Google’s defense based on 35 U.S.C. § 102(g)(2). *See* Section III, *infra*. Unlike the “known or used” and “in public use” prongs of Section 102(a) and (b), Section 102(g)(2) requires only that the prior art have been “made in this country by another . . . who had not abandoned, suppressed, or concealed it.” This aspect of Google’s invalidity defense must be tried to the jury even if the Court credits the arguments in Singular’s MIL No. 4.

- *Finally*, Singular’s argument about the Belanović thesis and IPR estoppel rests on the incorrect premise that any documentary evidence is a “printed publication” under 35 U.S.C. § 102. *See* Section IV, *infra*. To the contrary, “printed publication” is a term of art with a corresponding legal test. And despite bearing the burden of proving that IPR estoppel applies, Singular made no effort to establish that the documentary evidence regarding the VFLOAT system—including the Belanović thesis—constitutes a “printed publication” that could be subject to IPR estoppel.

## **I. SINGULAR’S MOTION IS PROCEDURALLY IMPROPER**

Google understands that the Court expressed an inclination to engage with the merits of Singular’s MIL No. 4 even if it should have been raised at summary judgment, but wishes to point out the following. The Court’s deadline for summary judgment motions was April 28, 2023—over eight months ago. Dkt. No. 443. Singular filed three summary judgment motions on or before the deadline, including two on the issue of invalidity. Dkt. Nos. 377, 464, 474. In none of those motions did Singular make the argument it now makes that the VFLOAT system did not constitute prior art, nor did it seek leave to file a summary judgment motion out of time, even though it could have done either. Instead, Singular’s MIL No. 4 overtly asks the Court to survey the evidence and hold as a matter of law that Google cannot “carry its burden to show that the ‘VFLOAT system’ was publicly known or used as required by § 102” and therefore that it does not qualify as prior art. Mot. at 3. But “pierc[ing] the pleadings” and “assess[ing] the proof in order to see whether there is a genuine need for trial” on the prior art status of the VFLOAT system is the function of summary judgment motions, not MILs. *Carrozza v. CVS Pharmacy, Inc.*, 992 F.3d 44, 56 (1st Cir. 2021). In fact, the Federal Circuit has deemed it an abuse of discretion to convert a MIL into a summary judgment motion and grant claim-dispositive relief, because doing so deprives the nonmoving party of the procedural safeguards attendant to summary judgment motions. *See*

*Meyer Intellectual Props. Ltd. v. Bodum, Inc.*, 690 F.3d 1354, 1378 (Fed. Cir. 2012) (reversing dismissal of inequitable conduct defense that was disposed of on plaintiff’s MIL, holding that “district court erred in addressing the sufficiency of Bodum’s inequitable conduct defense on an evidentiary motion” by “essentially convert[ing] Meyer’s motion *in limine* into a motion for summary judgment”).

## **II. THERE ARE GENUINE ISSUES OF MATERIAL FACT REGARDING PUBLIC KNOWLEDGE AND USE OF THE VFLOAT SYSTEM.**

Singular’s motion argues that the VFLOAT system does not qualify as prior art because there is purportedly “no evidence” that the knowledge or use of it was accessible to the public. Mot. at 1, 3. Even considering Singular’s argument on its merits, genuine disputes of material fact would require denial. This is especially true under the correct legal standard for determining whether a system is prior art under Section 102(a)-(b), which Singular misrepresents.

To begin, although Singular argues that the VFLOAT system “existed only for a brief time period”—and that “[t]he parties do not dispute” this, Mot. at 1—it provided no citation to the record either in its motion or at the pre-trial conferences. And at Dr. Leeser’s deposition, Singular asked her no questions regarding how long the VFLOAT system existed, so it is not clear what basis Singular had for making this representation to the Court. To be clear, Google disputes this factual assertion and expects the testimony to show that the VFLOAT system, configured with the C2 format, was not fleeting. Regardless, the duration of the experiment during which the VFLOAT system was physically incarnated is a red herring, because Dr. Leeser and Mr. Belanović repeatedly disseminated knowledge about the VFLOAT system to the public.

Furthermore, while the “known or used by others” prong of Section 102(a) requires knowledge or use which is “accessible to the public,” *Carella v. Starlight Archery & Pro Line Co.*, 804 F.2d 135, 139 (Fed. Cir. 1986), that does not mean the prior knowledge or use must literally

be open for inspection to, and observed by, the “general public” as Singular suggests. Mot. at 5–6. To the contrary, “[c]ourts have held that Section 102(a) requires only that the invention be accessible to the public, not that the public actually knew of or used the invention at issue.” *Sys. Mgmt. Arts Inc. v. Avesta Techs., Inc.*, 87 F. Supp. 2d 258, 263 (S.D.N.Y. 2000); *see also NYKO Techs. Inc v. Energizer Holdings Inc*, No. CV 12–3001, 2013 WL 11232100, at \*12 (C.D. Cal. Oct. 22, 2013) (“Even if the device had been shown only to one person in a back alley in the dead of night, it would constitute a public use under Section 102(b) so long as that person (1) used the claimed invention and (2) was under no requirement of confidentiality or secrecy.”). Indeed, even in Singular’s own cited cases, the Federal Circuit clearly explained that “prior knowledge and use by a single person is sufficient” to satisfy the “known or used” prong of Section 102(a), if the art is “accessible to the public ‘upon reasonable inquiry.’” *BASF Corp. v. SNF Holding Co.*, 955 F.3d 958, 965 (Fed. Cir. 2020); *see also UCB, Inc. v. Watson Labs. Inc.*, 927 F.3d 1272, 1289 (Fed. Cir. 2019) (“Prior knowledge and use by a single person is sufficient.”). For example, in *UCB, Inc. v. Watson Labs. Inc.*, the Federal Circuit held that prior use of a drug compound with just one patient was an invalidating prior “use” under Section 102(a) because “[t]he patient’s use of the patches fairly counts as public use under § 102(a).” 927 F.3d at 1291. Singular also repeatedly refers to Dr. Leeser’s VFLOAT system as an “experiment” and asserts that it “existed only for a brief time period,” incorrectly suggesting that it therefore cannot be prior art. Mot. at 1. That is not the law. *See Baxter Int’l, Inc. v. COBE Labs., Inc.*, 88 F.3d 1054, 1056–1060 (Fed. Cir. 1996) (finding that research scientist’s limited-duration “tests” and “experiments” of one centrifuge at National Institutes of Health laboratory were invalidating prior “public use” under Section 102); *cf. Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1326 (Fed. Cir. 2003) (“Just as an accused product that sometimes, but not always, embodies a claimed method nonetheless infringes . . . a

prior art product that sometimes, but not always, embodies a claimed method nonetheless teaches that aspect of the invention.”). Thus, even accepting Singular’s characterizations of the facts (which Google does not, nor can the Court because it must draw all inferences in Google’s favor), those disputed “facts” are not legally significant.

Under the correct legal standard, there is at minimum a genuine dispute of fact as to whether the VFLOAT system constitutes prior art under Section 102(a)-(b). Because Singular has filed only a (putative) MIL, Google has no obligation to marshal its evidence that the VFLOAT system constitutes prior art under Section 102(a)-(b). However, Google has ample evidence to establish that the VFLOAT system satisfies the requirements for prior art that is “known or used by others” under Section 102(a) and “in public use” under Section 102(b), contrary to Singular’s claim that “Google has provided no evidence to support a finding that [it] constitutes prior art.” Mot. at 1. As Dr. Leeser explained in her report, and as she will testify at trial, there were numerous public disclosures relating to and describing her VFLOAT system. Dr. Leeser discussed the VFLOAT system with her research sponsors at the Los Alamos National Laboratory (LANL). Dkt. No. 394 (“Leeser Decl.”) ¶¶ 4–8. She also gave related conference talks, including at the 2002 Institute of Electrical and Electronics Engineers (IEEE) High-Performance Embedded Computing (HPEC) conference held at the Massachusetts Institute of Technology (MIT), and has provided her slides for those conferences and will explain at trial what she disclosed to attendees—including that she showed and discussed the specific components of the VFLOAT system and how she utilized reduced precision number formats to implement large numbers of low-precision, high dynamic range execution units on that system, just as claimed in Singular’s patents. Leeser Decl. ¶¶ 23–25. Indeed, in her HPEC 2002 slides, Dr. Leeser showed attendees a photo of the specific reconfigurable computing hardware (a Field-Programmable Gate Array) used in the VFLOAT

system and explained how it was used. Because the relevant “public” in the context of Section 102 “refers to those who have ordinary skill in the art, and not necessarily to the general public,” *Sys. Mgmt. Arts*, 87 F. Supp. 2d at 269, Dr. Leeser’s conference presentations and other disclosures to researchers in the field are particularly relevant. In addition, Dr. Leeser’s graduate student Pavle Belanović, who helped develop the VFLOAT system, defended his thesis in a presentation at Northeastern University that was open to the public, where he also described the system in detail. Leeser Decl. ¶ 21.

Based on the sum total of this evidence, as will be adduced by Dr. Leeser at trial, a reasonable jury could find that the VFLOAT system was publicly described and accessible by others or used by others in the United States, regardless of how long it was in existence as a physical invention. That is, even if the VFLOAT system were a fleeting, experimental use, as Singular contends, public knowledge of that system is a stand-alone, separate basis on which the jury could find invalidity. Indeed, Singular’s motion concedes that there are adequate public disclosures to support a finding that the VFLOAT system constitutes prior art by 2002. Singular argues that the VFLOAT system “was not demonstrated, described, disclosed, or otherwise made known to the public *until Mr. Belanović presented his master’s thesis*” at Northeastern University as described above. Mot. at 1 (emphasis added). Singular thus effectively admits that the system was publicly known as of that point in 2002.

Notably, the above-identified disclosures relate to the VFLOAT system—the computer in Dr. Leeser’s lab with an Intel Pentium III processor, Wildstar board, and synthesized multiplier circuits configured with the C2 format (6 exponent bits, 9 fraction bits, and 1 sign bit). In its MIL No. 4 and at the recent pre-trial conference, Singular tried to argue a distinction between what it calls the “VFLOAT tool” and the “VFLOAT system.” Mot. at 3, 6-7. But as Singular’s brief

concedes, the VFLOAT tool “is a piece of software that was used as a tool to build the ‘VFLOAT system.’” *Id.* at 7; *see also id.* at 6 (noting that Dr. Leeser and Mr. Belanović “built [the VFLOAT system] using a software tool called VFLOAT”). Accordingly, Singular is wrong to say that they are “entirely different things” and that disclosures about the VFLOAT tool are “entirely irrelevant” to the VFLOAT system. *Id.* at 7. To the contrary, evidence about the VFLOAT tool proves up aspects of the VFLOAT system—for example, how the modules in the code library were configured with the C2 format, how the different code modules worked together to create an LHPDR execution unit for multiplying input numbers and reducing the precision of the output, and how that circuitry was then physically created on an FPGA on the Wildstar board. Moreover, not only did Dr. Leeser make that code publicly available on her university website starting in around 2002 (which code remains there to this day), she publicly promoted it to LANL, the 2002 HPEC conference at MIT, and the Northeastern University community, among others, as a tool to build the very system she actually built.

### **III. SINGULAR’S MIL IGNORES GOOGLE’S SECTION 102(G)(2) INVALIDITY DEFENSE.**

Even assuming, counterfactually, that the VFLOAT system cannot satisfy the public knowledge and/or use prongs of Section 102(a)-(b), Singular’s MIL No. 4 ignores the other statutory basis for invalidity identified in Dr. Leeser’s expert report: that “the invention was made in this country by another inventor who had not abandoned, suppressed, or concealed it” under Section 102(g)(2). “The distinction is important since, unlike a defense under section 102(a) where prior knowledge and use must be ‘public’ at the time the patented invention is made . . . prior invention under section 102(g) requires only that the invention be complete, i.e., conceived and reduced to practice, and not abandoned, suppressed or concealed.” *Int’l Glass Co. v. United States*, 408 F.2d 395, 402 (Ct. Cl. 1969). Singular’s motion did not address Section 102(g)(2) at all, nor

did Singular suggest at either the December 19 or 21 pre-trial conferences that its arguments extend to Section 102(g)(2). Accordingly, even if the Court were to treat Singular’s ostensible MIL as one for summary judgment, and even if it were to find (contrary to the law and the evidence identified in Section II, *supra*) that the VFLOAT system was not publicly known and/or used, under Section 102(a)-(b), Google’s invalidity defense under 102(g)(2) remains and must be decided by the jury. Thus, Singular’s request to altogether preclude Google “from arguing invalidity based on VFLOAT, alone or in combination with other references” must be denied. Mot. at 3.

**IV. SINGULAR FAILED TO CARRY ITS BURDEN TO PROVE THAT GOOGLE’S DOCUMENTARY EVIDENCE OF THE VFLOAT SYSTEM CONSTITUTES A “PRINTED PUBLICATION.”**

Although Singular asserted at the December 19 and 21 pre-trial conferences that its MIL is not based on IPR estoppel, the motion nonetheless rests on the incorrect premise that IPR estoppel precludes Google from proving up the VFLOAT system using documentary evidence. *See* Mot. at 3 (equating Belanović thesis with “printed publication[]”). In other words, Singular simply assumes that documentary evidence like the Belanović thesis is a “printed publication,” and from that premise concludes that it must be subject to IPR estoppel. But not all documentary evidence is a “printed publication” or used as a “printed publication” under Section 102(a) or (b), and Singular has not even attempted to satisfy its burden of proof on this issue. Written materials can be evidence showing that an invention was accessible to the public but not qualify as “printed publications,” which have to be widely accessible and permanent—and are therefore treated specially under Sections 102, 311, etc.

The Court previously ruled that the “grounds” estopped by 35 U.S.C. § 315(e)(2) are “any anticipation or obviousness claim based on prior art in the form of a patent or printed publication.” Dkt. No. 447 at 10. “Printed publication” in this context does not mean any document or printed

matter; “the statute does not require that a court bar all system-based prior art simply because a party had access to a printed publication describing that system at the time of the IPR.” *Id.* at 9 (citing *SPEX Techs. Inc. v. Kingston Tech. Corp.*, 202 WL 4342254, at \*15 (C.D. Cal. June 16, 2020)). Rather, “printed publication” is a term of art with a corresponding legal test on which there is a large body of precedent. *See, e.g., Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1348 (Fed. Cir. 2016) (“Whether a reference qualifies as a printed publication is a legal conclusion based on underlying factual determinations.”).

To qualify as a “printed publication,” a reference “must have been sufficiently accessible to the public interested in the art.” *Id.* “Public accessibility” is thus “the touchstone in determining whether a reference constitutes a ‘printed publication.’” *Id.* A reference is considered “publicly accessible” if it was “disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, can locate it.” *Id.* “In some cases, this inquiry is straightforward. But in other cases, public accessibility depends on a careful, case-by-case examination of how a particular reference was disseminated, to whom, for how long, and under what circumstances.” *Samsung Elecs. Co. v. Infobridge Pte. Ltd.*, 929 F.3d 1363, 1369 (Fed. Cir. 2019).

There are Federal Circuit cases addressing this inquiry for just about every possible type of “printed publication.” *See, e.g., Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 772-74 (Fed. Cir. 2018) (evaluating public accessibility of reference that was available only at a university’s public website); *Blue Calypso*, 815 F.3d at 1347-50 (“address[ing] the question of how to determine public accessibility of a reference housed on a webpage in one corner of the vast world wide web”). Indeed, there are Federal Circuit cases dealing specifically with whether theses qualify as “printed publications.” *In re Cronyn*, 890 F.2d 1158, 1161 (Fed. Cir. 1989)

(holding that theses were not “printed publications” because they “were not accessible to the public because they had not been either cataloged or indexed in a meaningful way”); *In re Hall*, 781 F.2d 897, 898 (Fed. Cir. 1986) (finding thesis to be “printed publication” where, although only one copy of it was shelved in university library, evidence showed that it was cataloged in the library prior to the critical date); *Application of Bayer*, 568 F.2d 1357, 1359-60 (C.C.P.A. 1978) (finding that “uncatalogued, unshelved” graduate thesis was not a “printed publication”). In *In re Cronyn*, for example, the Federal Circuit found that three undergraduate theses did not qualify as “printed publications”—even though they were “filed in the main college library and in the library of the particular department in which the student's work was done” and were “listed on individual cards which show the student's name and the title of the thesis”—because the theses were neither indexed nor cataloged in either the main university library or the chemistry department library. 890 F.2d at 1159.

Singular has not even attempted to prove that any of the documentary evidence regarding the VFLOAT system is invalidating prior art—including the Belanović thesis—constitutes a “printed publication” that could be subject to IPR estoppel. It is well-settled that Singular bears the burden of showing that IPR estoppel applies. *Ironburg Inventions Ltd. v. Valve Corp.*, 64 F.4th 1274, 1296-99 (Fed. Cir. 2023). As the Federal Circuit confirmed in *Ironburg Inventions*, the burden of proof rests “solely on the patent owner, as the party seeking to benefit from an assertion of estoppel.” *Id.* Moreover, this burden extends to subsidiary factual issues and is not merely an initial burden of production that shifts the burden of proof at some point to the party opposing estoppel. *See id.* (vacating and remanding because “the district court improperly placed the burden of proof on Valve, to show that it could not ‘reasonably . . . have raised’ the Non-Petitioned Grounds in its petition”). Despite bearing the burden of proof on this issue, Singular’s MIL

identifies no facts that would enable the Court to undertake the legally required “careful, case-by-case examination” of whether any of Google’s documentary evidence constitutes a “printed publication.” *Samsung*, 929 F.3d at 1369. Indeed, when Singular deposed Dr. Leeser, its counsel never asked her any questions about how this documentary evidence was “disseminated, to whom, for how long, and under what circumstances.” *Id.* Singular, in other words, has no record evidence to show that any of Google’s documentary evidence regarding the VFLOAT system constitutes a “printed publication,” and therefore has not carried its burden of proving that IPR estoppel applies to any of this documentary evidence.<sup>1</sup>

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<sup>1</sup> Google will not use documentary evidence as a “printed publication” to argue invalidity under Section 102 (and the Court can issue a limiting instruction if it feels one is necessary). Google instead intends to use written materials to support and corroborate testimony regarding non-patent, non-printed publication prior art under 102(a), 102(b), and/or 102(g)(2), as discussed above. *See* 3 Annotated Patent Digest § 17:141.50 (“When anticipation is based on the public use of prior art device, i.e., the physical thing, a challenger may rely on multiple pieces of evidence, including multiple documents, to show that prior art device meets each claim limitation. In this context[,] the documents are not being used to show anticipation by a ‘printed publication,’ which would require that a single printed publication disclose all of the claim limitations as arranged in the claim. Instead, the multiple documents are being used to show that the single prior art device, when used publicly, contained all of the claim limitations. Indeed, the use of multiple documents to show the use and the characteristic of the prior art device is just a way of corroborating the public use.”). Used for the purpose, documentary evidence regarding the VFLOAT system, including the Belanović thesis, is not estopped. *See Prolitec Inc. v. ScentAir Techs.*, C.A. No. 20-984-WCB (D. Del. Dec. 13, 2023) (holding that “IPR estoppel does not apply to device art, even when that device art is cumulative of patents and printed publications that were or could have been asserted in a prior IPR”); *see also SiOnyx LLC v. Hamamatsu Photonics*, 330 F. Supp. 3d 574, 603-04 (D. Mass. 2018) (denying plaintiff’s motion for partial summary judgment of invalidity to the extent that defendants were relying on “the product itself” in combination with other references, including three patent publications “discussed in the IPR petition”). Indeed, the contrary opinions of Singular’s expert, Dr. Khatri, depend on interpretations of the same documentary evidence, including without limitation the Belanović thesis, a 2002 publication by Belanović and Leeser titled *A Library of Parameterized Floating-Point Modules and Their Use*, and a Wildstar board manual. In fairness, Google and Dr. Leeser should be allowed to rely on the same documents to contest those opinions.

For the reasons set out above and in its prior briefing, Google respectfully requests that the Court deny Singular's MIL No. 4 seeking to preclude Google's invalidity defense.

Respectfully submitted,

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